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ONE ARTICLE FROM OER'S ECONOMIC INTELLIGENCE WEEKLY REVIEW  
ENDING 23 MARCH 1978.

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COPPER: LDCS DEVELOPMENTS THREATEN ESTABLISHED PRODUCERS.

1. THE EXPANSION OF SMELTING AND REFINING STAGES IN THE COPPER MINING LDCS FORESHADOWS REDUCTIONS IN THE COPPER INDUSTRIES OF THE MAJOR DEVELOPED COUNTRIES. PRODUCERS IN THESE COUNTRIES ARE FACED WITH SKY-ROCKETING POLLUTION ABATEMENT COSTS, HIGH WAGE BILLS, SLOW PRODUCT DEMAND GROWTH, AND RISING IMPORTS OF CHEAPER LDC REFINED COPPER. PHASEOUT OF CAPACITY IN SOME OF THE MAJOR INDUSTRIAL COUNTRIES INCLUDING THE UNITED STATES AND JAPAN, COULD BE MODERATED BY PROTECTIONIST MEASURES AND/OR A RELEXATION OF ENVIROMENTAL CONSTRAINTS.

MARKET DEPRESSED.

2. REFINERS IN DEVELOPED COUNTRIES ARE WHIPSAWED BY WEAK DEMAND, WORLD OVERCAPACITY, RECORD STOCKS, AND LOW PRICES. FREE WORLD CONSUMPTION OF REFINED COPPER HAD NEVER RETURNED TO THE RECORD HIGH OF 6.9 MILLION TONS OF 1973; MEANWHILE CAPACITY HAS INCREASED BY 1.3 MILLION TONS. THE WORLD MARKET PRICE IN THE LONDON METAL EXCHANGE (LME) HAS FALLEN BY MORE THAN 50 PERCENT, FROM A RECORD \$1.38 PER POUND IN APRIL 1974 TO LESS THAN 60 CENTS, WHILE STOCKS OF REFINED COPPER HAVE RISEN TO A RECORD 2 MILLION TONS PLUS. THE EFFECTS OF THE DEPRESSED MARKET SINCE 1973 ON THE US INDUSTRY HAVE BEEN PARTICULARLY SEVERE: (A) PRODUCTION IS DOWN 18 PERCENT SINCE 1974, (B) CONSUMPTION IS DOWN 20 PERCENT, (C) EXPORTS ARE DOWN 41 PERCENT, AND (D) IMPORTS ARE UP 91 PERCENT.

MARKET STRUCTURE.

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3. FIFTEEN NATIONS ACCOUNT FOR 90 PERCENT OF FREE WORLD COPPER MINING AND REFINING:

--THE UNITED STATES IS BY FAR THE LARGEST PRODUCER, MINING AND REFINING ABOUT ONE-QUARTER OF TOTAL OUTPUT. ALTHOUGH SELF-SUFFICIENT IN TERMS OF CAPACITY, THE UNITED STATES USUALLY IMPORTS ABOUT 10 PERCENT OF ITS ANNUAL CONSUMPTION OF REFINED COPPER.

--SIX LDCS--CHILE, PERU, ZAMBIA, ZAIRE, THE PHILIPPINES, AND PAPAU NEW GUINEA--ACCOUNT FOR NEARLY ONE-HALF OF FREE WORLD MINE OUTPUT (COPPER CONTENT) AND ONE-QUARTER OF REFINED OUTPUT. THE SIX EXPORT MOST OF THEIR PRODUCTION TO DEVELOPED COUNTRIES, SHIPPING CONCENTRATES AND BLISTER COPPER AS WELL AS REFINED COPPER.

--CANADA, AUSTRALIA, AND SOUTH AFRICA TOGETHER MINE MORE THAN 20 PERCENT OF FREE WORLD COPPER AND REFINED ABOUT 12 PERCENT. APPROXIMATELY TWO-THIRDS OF THEIR OUTPUT IS REFINED DOMESTICALLY AND THE REST IS EXPORTED TO OTHER DEVELOPED NATIONS FOR REFINING. THE THREE CONSUME ABOUT ONE-HALF OF THEIR REFINED OUTPUT AND EXPORT THE REMAINDER.

--FOUR DEVELOPED COUNTRIES--JAPAN, BELGIUM, WEST GERMANY, AND THE UNITED KINGDOM--MINE ALMOST NO COPPER BUT REFINED 30 PERCENT OF FREE WORLD OUTPUT. THEIR INPUTS ARE OBTAINED FROM THE SIX COPPER EXPORTING LDCS, CANADA, AND SOUTH AFRICA. ALL EXCEPT BELGIUM CONSUME THEIR ENTIRE REFINED OUTPUT.

#### THE APPEAL OF VERTICAL INTEGRATION.

4. LDCS VIEW THEIR MOVEMENT INTO THE SMELTING AND REFINING STAGES AS AN ATTRACTIVE MEANS OF INCREASING THEIR EXPORT EARNINGS AND DEVELOPING THEIR INDUSTRIAL BASE. VERTICAL INTEGRATION IS FACILITATED BY LOW INVESTMENT COSTS AND HIGH VALUE ADDED. ORE PRODUCING LDCS FIND THAT A SMALL ADDITIONAL INVESTMENT OF \$2,500 PER TON IN SMELTING AND REFINING CAPACITY CAN EXPAND THE VALUE OF PRODUCT BY ABOUT ONE-THIRD. THIS GAIN, COUPLED WITH THE RICHER ORE BODIES, CHEAPER LABOR, AND FEWER ENVIRONMENTAL CONSTRAINTS, IS ATTRACTING FOREIGN CAPITAL TO THE LDCS.

#### STATUS OF THE MAJOR LDC EXPORTERS.

5. THE DEGREE OF LDC VERTICAL INTEGRATION VARIES: THE

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PHILIPPINES AND PAPUA NEW GUINEA PROCESS SOME OF THEIR MINE OUTPUT THROUGH THE CONCENTRATE STAGE AND EXPORT BOTH ORES AND CONCENTRATES. AT THE OTHER EXTREME, ZAMBIA EXPORTS NEARLY ALL OF ITS OUTPUT AS REFINED COPPER.

6. PERU POSSESSES ENORMOUS COPPER RESERVES AND HAS AN AMBITIOUS EXPANSION PROGRAM, WHICH EVENTUALLY WILL MAKE IT ONE OF THE WORLD'S LARGEST COPPER PRODUCERS. IN NOVEMBER 76 THE NEW CUAJONE MINE BEGAN PRODUCING AN ANNUAL RATE OF 150,000 TONS. OUTPUT FROM THIS MINE ADDED AN ESTIMATED \$175 MILLION TO FOREIGN EXCHANGE EARNINGS IN 1977. THE ILO REFINERY CAME ONSTREAM IN MID-1976 WITH A CAPACITY OF 150,000 TONS. ILO'S CAPACITY WILL BE DOUBLED BY EARLY 1979. APPROXIMATELY 16,000 TONS WILL BE ADDED TO THE CAPACITY OF THE LA OROYA REFINERY IN 1978, RAISING PERU'S REFINERY CAPACITY TO 366,000 TONS. WHEN A NEW 170,000-TON-SMELTER NOW UNDER CONSTRUCTION AT CUAJONE IS COMPLETED, PERU WILL SMELT AND REFINES PRACTICALLY ALL ITS MINE OUTPUT.

7. CHILE, POSSESSOR OF THE WORLD'S LARGEST COPPER RESOURCES, CAN PRODUCE AT THE PRESENT ANNUAL RATE OF 1 MILLION TONS FOR 150 YEARS. AT THE PRESENT, CHILE SMELTS ABOUT 85 PERCENT OF MINE OUTPUT AND REFINES ABOUT 65 PERCENT. A SMALL EXPANSION OF EXISTING MINES IS PLANNED, AND A NEW 100,000-TON SMELTER IS UNDER CONSIDERATION.

8. ZAIRE MINES ABOUT 500,000 TONS OF COPPER ANNUALLY, SMELTS 450,000 TONS, AND REFINES 250,000 TONS. MOST OF ITS SMELTED COPPER AND LEACH CATHODES ARE EXPORTED TO BELGIUM FOR FURTHER REFINING.

9. ZAIRE PLANS TO CONSTRUCT A 100,000-TON REFINERY IN MALUKU AT A COST OF \$460 MILLION AND A SMELTER OF EQUAL SIZE. THE REFINERY COULD BE COMPLETED BY 1980 AND THE SMELTER SEVERAL YEARS LATER. EVENTUALLY THE SIZE OF THE REFINERY IS TO BE DOUBLED. EVEN SO, ZAIRE WILL REFINES ONLY 70 PERCENT OF THE PRESENT LEVEL OF MINE OUTPUT AND CONSIDERABLY LESS IF PLANS TO EXPAND MINE OUTPUT TO 800,000 TONS ARE CARRIED OUT.

10. ZAMBIA REFINES ITS ENTIRE MINE OUTPUT OF 700,000 TONS. PLANS TO EXPAND ARE LIMITED TO A SMALL ELECTROWINNING REFINERY OF ABOUT 20,000 TONS, WHICH COULD BE ONSTREAM BY MID-1980. THE PLANT WILL COST \$134 MILLION.

11. THE PHILIPPINES MINE 230,000 TONS OF COPPER ANNUALLY, EXPORTING ORES AND CONCENTRATES. VERTICAL INTEGRATION PLANS HAVE BEEN CUT BACK TO ONE 84,000-TON SMELTER, SCHEDULED FOR

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COMPLETION IN 1980 AT AN ESTIMATED COST OF \$220 MILLION. THIS SMELTER WILL BE ABLE TO PROCESS ONLY ABOUT 40 PERCENT OF CONCENTRATE OUTPUT. CONSTRUCTION OF A REFINERY IS STILL UNDER CONSIDERATION.

12. PAPUA NEW GUINEA MINES 180,000 TONS OF COPPER ANNUALLY WHICH IT PROCESSES THROUGH THE CONCENTRATE STAGE. CONCENTRATES ARE EXPORTED TO JAPAN AND WEST GERMANY FOR SMELTING AND REFINING. NO SMELTERS OR REFINERIES ARE PLANNED AT THE PRESENT TIME.

#### COMPETITIVE ADVANTAGE.

13. POLLUTION, ABATEMENT REQUIREMENTS AND RISING OPERATING COSTS IN THE MAJOR INDUSTRIAL COUNTRIES HAVE WIDENED THE LDC EDGE IN THE SMELTING AND REFINING STAGES. POLLUTION CONTROL PROGRAMS HAVE RAISED THE COSTS OF SMELTING AND REFINING BY AS MUCH AS 16 CENTS A POUND--ABOUT 30 PERCENT OF THE PRESENT PRICE OF REFINED COPPER.

14. THE LDCS ARE EXPLOITING THEIR COST ADVANTAGE BY MAINTAINING OUTPUT AT CAPACITY LEVELS AND UNDERPRICING OLD LINE PRODUCERS IN CERTAIN MARKETS. US PRODUCERS HAVE BEEN ESPECIALLY HARD HIT; US IMPORTS ROSE TO RECORD LEVELS IN 1976 AND ROSE AGAIN IN 1977, KEEPING CAPACITY UTILIZATION BELOW 70 PERCENT.

#### OUTLOOK.

15. LDC COPPER PRODUCERS WILL MAINTAIN THEIR COMPETITIVE EDGE OVER INTO THE 1980S. HOWEVER, THEIR PROFITS WILL BE CHECKED BY CONTINUED LOW PRICES AND SLOW GROWTH IN PRODUCT DEMAND.

16. DURING 1978-80, COMPLETION OF REFINERIES NOW UNDER CONSTRUCTION WILL RAISE WORLD CAPACITY BY MORE THAN HALF A MILLION TONS, OR BY ABOUT 10 PERCENT. MOST OF THE NEW CAPACITY WILL BE IN THE LDCS, WITH PERU ADDING 200,000 TONS AND MEXICO AND IRAN EACH ADDING 150,000 TONS. BY 1980, MEXICO AND IRAN WILL JOIN THE RANKS OF COPPER EXPORTING NATIONS.

17. AS FOR 1981-85, ANNOUNCED PLANS CALL FOR ABOUT 650,000 TONS OF ADDITIONAL REFINING CAPACITY, ALL TO BE ADDED TO LDCS. ALTHOUGH THESE PLANS ARE TENTATIVE AND MAY BE RAISED OR LOWERED AS MARKET TRENDS BECOME CLEARER, THEY SUGGEST THAT NO SUDDEN TIGHTENING IN THE COPPER MARKET IS LIKELY.

18. WE EXPECT EXPORTS OF REFINED COPPER TO THE INDUSTRIAL

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COUNTRIES TO INCREASE AS VERTICAL INTEGRATION CONTINUES. THE DEVELOPED COUNTRIES THUS FACE SOME HARD CHOICES:

--TO ALLOW MARKET FORCES TO PHASE OUT A SUBSTANTIAL PORTION OF THE DOMESTIC COPPER INDUSTRY,

--TO ESTABLISH PROTECTIONIST MEASURES,

--TO IMPROVE THE COMPETITIVE POSITION OF THE DOMESTIC INDUSTRY BY RELAXING ENVIROMENTAL CONSTRAINTS. (UNCLASSIFIED).  
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